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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/667,522
Filing Date: September 23, 2003
Appellant(s): JACKSON ET AL.

Wei-Chen Nicholas Chen
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 14, 2007 appealing from the Office action mailed November 30, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The amendment after final rejection filed on April 30, 2007 has been entered.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,724,743	JACKSON	3-1998
6,115,927	HENDRIX	9-2000
5,923,027	STAM et al.	7-1999
4,614,866	LISS et al.	9-1986

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4-9, 12, 13, 15-18, 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (U. S. Patent No. 5,724,743) in view of Hendrix (U. S. Patent No. 6,115,927).

Regarding claims 1, 2, 4-9, 12: Jackson discloses a three-dimensional camera based position determination system (Fig. 2 and 110), comprising: an optically scannable target (126) device fixedly attached to a target object (112-115); at least one camera and light subsystem (122), each subsystem having: an image sensing device configured to view the optically scannable target device and to generate image information indicative of geometric characteristics of the target device (148); and at least one light emitting diode (142) operatively coupled to a strobe circuit (Col 7, lines 45-50), the at least one diode and circuit being configured to emit strobed light thereby illuminating the optically scannable target such that the light is retro-reflected to the image sensing device and the image sensing device detects and forms an image of the target (Col 7, lines 15-50 and Col 20, line 25-Col 21, line 30); and a data processing device (32, 34, 36, Fig. 2) operatively coupled to the image sensing device, the data processing device being configured to determine the orientation of the target object based on the generated target image.

Jackson discloses the position determining system wherein the at least one light emitting diode is an array of light emitting diodes (Col 21, lines 1-15); wherein the number of light emitting diodes in the array is sixty-four (Col 21, lines 1-15);

Jackson discloses the position determination system wherein the target object is a vehicle wheel (112-115), and the data processing device is further configured to determine proper wheel alignment based on orientation of the vehicle wheel (Abstract);

Jackson discloses the position determination system wherein the image sensing device includes an electronic shutter that is synchronized with the at least one strobed light emitting diode such that an image is captured only when a target is illuminated (Col 7, lines 15-50).

Jackson discloses the position determination system wherein the image sensing device is a charge-coupled device video camera (Col 6, lines 62-66, Col 21, lines 16-30).

Jackson does not disclose the position determination system wherein the at least one light emitting diode comprises at least one invisible light emitting diode; wherein the invisible light is infrared light; a current source configured to supply a current to the at least one invisible light emitting diode.

Hendrix discloses a three-dimensional camera based position determining system, comprising: at least one camera and light subsystem (16, 12), each subsystem having: an image sensing device (16) configured to generate image information (Col 4, lines 46-54, Col 7, lines 12-28); and at least one invisible light emitting diode (14) operative coupled to a strobe circuit, the at least one diode and circuit being configured to emit strobed invisible light that is directed to the image sensing device and the image sensing device detects and forms an image (Col 5, lines 1-13); a data processing device (20) operative coupled to the image sensing device, the data processing device being configured to determine the orientation of an object based on the generated image (Col 10, lines 6-65); and a visible indicator (22) that indicates whether the at least one invisible diode is operative (Col 10, lines 6-65).

Hendrix discloses the position determination system wherein the invisible light is infrared light (Col 4, lines 46-54, Col 5, lines 32-44); wherein the at least one invisible light emitting

diode is an array of light emitting diodes (Col 4, lines 46-54, Col 5, lines 32-44); wherein the image sensing device is a charge-coupled device video camera (Col 7, lines 12-28).

Hendrix discloses the position determination system comprising a current source configured to supply a current to the at least one invisible light emitting diode (Col 4, line 46-Col 5, line 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the light emitting diodes of Jackson include at least one invisible light emitting diode, as taught by Hendrix, since Hendrix discloses that invisible and visible light are alternative and functionally equivalent in the use of the device (Hendrix, Col 5, lines 5-12), and so that the work area where the device is being used is not as visibly optically cluttered to the user, as it would be with the visible light being emitted.

Regarding the number of invisible light emitting diodes in the array being eighty (claim 6): Jackson and Hendrix disclose a position determining system where the number of invisible light emitting diodes in the array is sixty-four. However, to choose a value for the number of diodes in the array to be eighty, absent any criticality, is only considered to be the "optimum" value of the number of diodes in the array, as stated above, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See ***In re Boesch***, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the number of invisible light emitting diodes in the array of Jackson and Hendrix to have eighty invisible light emitting diodes in order to have more diodes in the array, increasing the accuracy of the array and hence, the accuracy of the position determining system.

Regarding claims 13, 15, 16: Jackson discloses a three-dimensional camera based position determination system, comprising: an optically scannable target device (126) fixedly attached to a target object (Figs. 2, 4, 9); at least one camera and light subsystem (122), each subsystem having: an image sensing device (148) configured to view the optically scannable target device and to generate image information indicative of geometric characteristics of the target device (Col 21, lines 1-16); and at least one light emitting diode (140, 142) operatively coupled to a strobe circuit, the at least one diode and circuit being configured to emit strobed light thereby illuminating the optically scannable target such that the light is retro-reflected to the image sensing device and the image sensing device detects and forms an image of the target (Col 7, lines 45-50, Col 20, line 55-Col 21, line 30); a data processing device operatively coupled to the image sensing device, the data processing device being configured to determine the orientation of the target object based on the generated target image (Col 8, lines 46-64, Col 9, lines 40-65); and a target image indicator, disposed on the camera and light subsystem (since the camera and light subsystem is not described in "closed" claim language, the target image indicator is considered to be on the camera and light subsystem), configured to display the status of target acquisition by the data processing device, wherein the status of the target acquisition indicated whether an obtained image of the scannable target is acceptable (Col 12, line 65-Col 13, line 19).

Jackson discloses the position determination system wherein the target object is a vehicle (Figs. 2, 4, 9).

Jackson does not disclose the position determination system wherein the emitted light is invisible light; comprising a directional indicator for indicating a manner by which the target object should be manipulated; wherein the directional indicator indicates whether the vehicle

should be moved forward or backward, or whether a wheel of the vehicle should be steered right or left.

Hendrix discloses a three-dimensional position determination system wherein the image sensing device is a camera (16); wherein the at least one diode (14) is operatively coupled to a strobe circuit (Col 5, lines 5-13); wherein the target object indicator is configured to display the status of target acquisition by the data processing device, wherein the status of target acquisition indicates whether an obtained image of the scannable target is acceptable (Col 9, line 60-Col 10, line 18); comprising a directional indicator for indicating a manner by which the target object should be manipulated (Col 10, lines 6-65); wherein the directional indicator indicates whether the vehicle should be moved forward or backward, or whether a wheel of the vehicle should be steered right or left (Col 10, lines 6-65).

Hendrix discloses the position determination system comprising a directional indicator for indicating a manner by which the target object should be manipulated (Col 11, lines 51-67); wherein the directional indicator indicates whether the vehicle should be moved forward or backward, or whether a wheel of the vehicle should be steered right or left (Col 11, lines 51-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the light emitting diodes of Jackson include at least one invisible light emitting diode, as taught by Hendrix, since Hendrix discloses that invisible and visible light are alternative and functionally equivalent in the use of the device (Hendrix, Col 5, lines 5-12), and so that the work area where the device is being used is not as visibly optically cluttered to the user, as it would be with the visible light being emitted; and to include a visual indicator for indicating a manner by which the object should be manipulated to the position determination system of Jackson, as taught by Hendrix, so that a user could more accurately manipulate the object in order to get the most accurate results (Hendrix, Col 11, lines 51-67).

Regarding claims 17, 18, 20-25: Jackson discloses a three-dimensional camera based position determination system (Fig. 2 and 110), comprising: sensing means for sensing an image of a target device, and generating information indicative of geometric characteristics of the target device (Col 7, lines 15-50 and Col 20, line 25-Col 21, line 30); and emission means for emitting strobed light that illuminates the optically scannable target such that the light is retro-reflected to the image sensing device (Col 7, lines 45-50, Col 21, lines 1-20) and the image sensing device detects and forms and image of the target (Col 10, lines 37-48, Col 20, lines 25-36); and data processing means for determining the orientation of the object based on the generated target image (Col 8, line 45-Col 9, line 23, Col 10, lines 37-48).

Jackson discloses the position determination system wherein the target object is a vehicle wheel, and the data processing means is configured to determine proper wheel alignment of the vehicle wheel (Figs. 2, 4, 9, Col 1, lines 5-18).

Jackson discloses the position determination system wherein the image sensing means includes an electronic shutter that is synchronized with the emission means such that an image is captured only when a target is illuminated (Col 7, lines 45-50).

Jackson discloses the position determination system comprising attachment means for fixedly attaching an optically scannable target device to a target object (Fig. 9, Col 20, lines 55-67).

Jackson discloses the position determination system comprising target object indicator means for indicating that the sensing means is sensing the target object (Col 9, lines 8-23, Col 12, line 65-Co 13, line 44, specifically Col 13, lines 36-44, the pattern recognition will indicate that the sensing means is sensing the target object).

Jackson discloses the position determination system comprising target object indicator means for indicating the state of target acquisition by the data processing device (Col 8, lines 46-64, Col 12, line 65-Col 13, line 19).

Jackson does not disclose the position determination system wherein the emitted light is invisible light; wherein the invisible light is infrared light; comprising directional means for indicating the direction in which a target object should be repositioned, and for indicating that a target object has been properly positioned.

Hendrix discloses a three-dimensional camera based position determining system, comprising: sensing means for sensing an image of a target device, and generating image information indicative of the geometric characteristics of the target object (Col 4, lines 46-54, Col 7, lines 12-28); and emission means for emitting strobed invisible light that illuminates the optically scannable target (Col 5, lines 1-13); and a data processing means for determining the orientation of the target object based on the generated target image (Col 10, lines 6-65).

Hendrix discloses the position determination system wherein the invisible light is infrared light (Col 4, lines 46-54, Col 5, lines 32-44); comprising directional means for indicating the direction in which a target object should be repositioned, and for indicating that a target object has been properly positioned (Col 11, lines 51-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the light emitting diodes of Jackson include at least one invisible light emitting diode, as taught by Hendrix, since Hendrix discloses that invisible and visible light are alternative and functionally equivalent in the use of the device (Hendrix, Col 5, lines 5-12), and so that the work area where the device is being used is not as visibly optically cluttered to the user, as it would be with the visible light being emitted.

Regarding claims 26 and 27 (wherein claim 27 claim language is directed to the "means" for each positively claimed component of claim 26): Jackson discloses an image-based position determination system (Fig. 2 and 110) for optically scanning a target device related to an object, the system comprising: at least one camera and light subsystem (122), each subsystem having: an image sensing device configured to view the target device and to generate image information indicative of geometric characteristics of the target device (148); and at least one light emitting diode (142) operatively coupled to a strobe circuit (Col 7, lines 45-50), the at least one diode and circuit being configured to emit strobed light thereby illuminating the target such that the light is retro-reflected to the image sensing device and the image sensing device detects and forms an image of the target (Col 7, lines 15-50 and Col 20, line 25-Col 21, line 30); and a data processing device (32, 34, 36, Fig. 2) configured to couple to the image sensing device to determine the orientation of the object based on the generated target image (Col 8, line 45-Col 9, line 23, Col 10, lines 37-48).

Jackson does not disclose the position determination device comprising a visual indicator for indicating a manner by which the object should be manipulated such that the image sensing device obtains an image of the target device in a different position, the data processing device configured to couple to the visual indicator and the image sensing device.

Hendrix discloses a position determination device comprising a visual indicator for indicating a manner by which the object should be manipulated such that the image sensing device obtains an image of the target device in a different position, the data processing device configured to couple to the visual indicator and the image sensing device (Col 10, lines 6-18, Col 11, lines 51-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a visual indicator for indicating a manner by which the object should be

manipulated to the position determination system of Jackson, as taught by Hendrix, so that a user could more accurately manipulate the object in order to get the most accurate results (Hendrix, Col 11, lines 51-67).

Regarding claim 28: Jackson discloses a three-dimensional camera based position determination system, comprising: an optically scannable target device (126) fixedly attached to a target object (Figs. 2, 4, 9); at least one camera and light subsystem (122), each subsystem having: an image sensing device (148) configured to view the optically scannable target device and to generate image information indicative of geometric characteristics of the target device (Col 21, lines 1-16); and at least one light emitting diode (140, 142) operatively coupled to a strobe circuit, the at least one diode and circuit being configured to emit strobed light thereby illuminating the optically scannable target such that the light is retro-reflected to the image sensing device and the image sensing device detects and forms an image of the target (Col 7, lines 45-50, Col 20, line 55-Col 21, line 30); a data processing device operatively coupled to the image sensing device, the data processing device being configured to determine the orientation of the target object based on the generated target image (Col 8, lines 46-64, Col 9, lines 40-65); and a target image indicator that displays the status of target acquisition by the data processing device, wherein the status of the target acquisition indicated whether an obtained image of the scannable target is acceptable (Col 12, line 65-Col 13, line 19).

Jackson does not disclose the position determination device comprising directional means for indicating the direction in which the target object should be repositioned, and for indicating whether the target object has been properly positioned.

Hendrix discloses a position determination device comprising directional means for indicating the direction in which the target object should be repositioned, and for indicating whether the target object has been properly positioned (Col 10, lines 6-18, Col 11, lines 51-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include directional means for indicating the direction in which the target object should be repositioned to the position determination system of Jackson, as taught by Hendrix, so that a user could more accurately manipulate the object in order to get the most accurate results (Hendrix, Col 11, lines 51-67).

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson and Hendrix as applied to claims 1, 2, 4-9, 12, 13, 15-18, 20-28 above, and further in view of Stam et al. (U. S. Patent No. 5,923,027).

Jackson and Hendrix disclose the position determining system as described above in paragraph 3.

Jackson and Hendrix do not disclose a position determining system wherein the image sensing device is a complimentary metal oxide semiconductor camera.

Stam et al. discloses an image sensing device, which is a complimentary metal oxide semiconductor camera (Col 5, lines 45-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the image sensing device of Jackson and Hendrix to be a complimentary metal oxide semiconductor camera, as taught by Stam et al., since the complimentary metal oxide semiconductor camera is both economical and highly sensitive and therefore, more cost effective and accurate (Stam et al., Col 5, lines 45-58).

4. Claims 3, 19, 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson and Hendrix as applied to claim 1, 2, 4-9, 12, 13, 15-18, 20-28 above, and further in view of Liss et al. (U. S. Patent No. 4,614,866).

Jackson and Hendrix disclose the position determination system as described above in paragraph 3.

Jackson and Hendrix do not disclose the position determination system including a visible indicator that conclusively indicates whether the at least one invisible light emitting diode is operative, wherein the visible indicator is disposed in the camera and light subsystem.

Liss et al. discloses a system comprising a visible indicator that conclusively indicates whether at least one invisible light emitting diode is operative (Col 1, line 59-Col 2, line 6, Col 2, lines 50-60, Col 4, lines 12-35); wherein the visible indicator emits light within the visible spectrum (68), and thereby indicates that the at least one invisible light emitting diode is operative (Col 1, line 59-Col 2, line 6, Col 2, lines 50-60, Col 4, lines 12-35); wherein the visible indicator is disposed in the camera and light subsystem (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a conclusive indicator indicating whether the at least one invisible light emitting diode is operative to the device of Jackson and Hendrix, as taught by Liss et al., in order for the operator to conclusively and immediately determine that the device is operative, increasing the usefulness of the device for operators of varying levels of proficiency in the use of the device (Liss et al., Col 1, line 59-Col 2, line 25).

(10) Response to Argument

5. In response to Appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to include an invisible light emitting diode in the device of Jackson is taught by Hendrix, in that Hendrix discloses that invisible and visible light are

alternative and functionally equivalent in the use of the device (Hendrix, Col 5, lines 5-12), further motivation is so that the work area where the device is being used is not as visibly optically cluttered to the user, as it would be with the visible light being emitted and that there is an expectation of success in using invisible light as opposed to visible light since the properties of light, i.e. retro-reflection, hold for both visible and invisible light.

It is noted that it appears that Appellant is arguing the replacement of the structure of Hendrix with the structure of Jackson. However, this is not the rejection made by Examiner. Jackson discloses the structure of the three-dimensional camera based position determination system substantially as claimed. Jackson does not specifically disclose using at least one invisible light emitting diode. Hendrix discloses an alignment system wherein the light source used is at least one invisible light emitting diode, and wherein visible or invisible light emitting diodes may be used. It is the teaching of using a light source of invisible light emitting diodes for the light emitting diodes of Jackson that is the rejection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include directional means for indicating the direction in which the target object should be repositioned to the position determination system of Jackson, as taught by Hendrix, so that a user could more accurately manipulate the object in order to get the most accurate results (Hendrix, Col 11, lines 51-67).

Regarding Appellant's arguments that the Hendrix reference, Col 5, lines 5-8, teaches replacing "infrared light" with a visible light source, and therefore not replacing a visible light source with an infrared light source, Examiner disagrees. Hendrix teaches in Col 5, lines 5-8 that the two light sources, infrared (invisible) and visible, are equivalent and can be replaced one for the other. Therefore, one light source can be replaced with the other light source depending on the specific desires of the user.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Appeal Conference Date:

September 27, 2007

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